

Claims

1. A communications network, in particular for telephony, characterised in that it comprises:

at least one operator (2);

5 a plurality of remote units (3, 4) designed to exchange signals with the operator (2) and to exchange radio frequency (RF) signals with mobile terminals (5);

10 an interface unit (6) inserted between the operator (2) and the remote units (3, 4), the interface unit (6) having at least one input (7) for receiving signals from the remote units (3, 4) and at least one output (8) for sending signals to the remote units (3, 4), the interface unit (6) also being designed to exchange signals with the operator (2);

15 a first transmission support (9) for connecting the interface unit (6) to the remote units (3, 4), the first transmission support (9) being designed to support a main signal (44), the first transmission support (9) having a first end (10) connected to the interface unit (6) input (7) and at least a second end (11) connected to the interface unit (6) output (8), the main signal (44) consisting of a plurality of secondary signals (45), each identified by a preset parameter value, each of the remote units (3, 4) being designed to process a secondary signal (45a) intended for it, each of the remote units (3, 4) being able to select at least one secondary signal (45a) intended for it according to the preset parameter value.

25 2. The network according to claim 1, characterised in that the preset parameter is a wavelength, the remote units (3, 4) sending to and receiving from the interface unit (6) signals at the wavelength (λ_i) associated with them.

30 3. The network according to claim 1 or 2, characterised in that the secondary signals (45) received from and sent to the interface unit (6) by the remote units (3, 4) are bundled and preferably multiplexed by the interface unit (6) according to the dense wave division multiplexing (D-WDM) technique, in particular according to the semi-dense wave division multiplexing (SD-WDM) technique.

4. The network according to claim 1 or 2, characterised in that the first transmission support (9) comprises an optic fibre support, the main signal (44) being an optical signal propagating from the second end (11) to the first end (10).

5 5. The network according to any of the foregoing claims, characterised in that each remote unit comprises:

10 a signal transmission block (12) connected to the first transmission support (9) for picking up at least one secondary signal (45a) from the main signal (44) to be transmitted in the DL;

a signal reception block (13) connected to the first transmission support (9) for adding at least one signal received in the UL to the main signal (44);

15 an antenna (14) attached to the signal transmission block (12) and to the signal reception block (13) for transmitting RF signals to the mobile terminals (5) and for receiving RF signals from the mobile terminals (5).

6. The network according to claim 5, characterised in that the signal transmission block (12) comprises:

20 an optical filter element (15) connected to the first transmission support (9) for selecting, within the main signal (44), the secondary signal (45a) characterised by the parameter value associated with the remote unit;

25 preferably a first equaliser block (16) connected downstream of the optical filter element (15);

a first electro-optical converter (17), for converting the optical signal from the interface unit (6) into an electrical signal;

30 a first amplifier block (18) connected to the first electro-optical converter (17);

a first RF filter (19) for filtering the signals from the first converter.

7. The network according to claim 5 or 6, characterised in that the signal reception block (13) comprises:

35 a second RF filter (20) for filtering a signal from the antenna (14);

a second amplifier block (21) connected to the second RF filter (20);

a second electro-optical converter (22) for converting an electrical signal from the second RF filter (20) into an optical signal;

preferably, a second equaliser block (23) connected downstream of the second electro-optical converter (22);

a signal insertion element (24) for adding a signal received, characterised by the preset parameter value associated with the remote unit, to the main signal (44).

8. The network according to any of the foregoing claims, characterised in that the interface unit (6) comprises:

a signal transmission circuit (25) connected to the output (8) and connected to the second end (11) of the first transmission support (9), the signal transmission circuit (25) picking up signals from the operator (2) and sending them to the remote units (3, 4);

a signal reception circuit (26) connected to the input (7) and connected to the first end (10) of the first transmission support (9), the signal reception circuit (26) receiving signals from the remote units (3, 4) and transmitting them to the operator (2).

9. The network according to claim 8, characterised in that the signal transmission circuit (25) comprises:

a first routing matrix (27) with at least one input connected to the operator (2) for receiving a signal from the operator (2) and two or more outputs for sending electrical signals;

a first electro-optical converter unit (28) connected to the outputs of the first routing matrix (27), for transforming the electrical signals from the first routing matrix (27) into optical signals;

a multiplexer (29) between the first electro-optical converter unit (28) and the second end (11) of the first transmission support (9), for bundling and transferring the optical signals from the first electro-optical converter unit (28) in the first transmission support (9).

10. The network according to claim 8 or 9, characterised in that the signal reception circuit (26) comprises:

a demultiplexer (30) connected to the first end (10) of the first transmission support (9), for receiving the main signal (44) and having a plurality of outputs for sending optical signals;

5 a second electro-optical converter unit (31) connected to the outputs of the demultiplexer (30) for transforming the optical signals sent by the demultiplexer (30) into electrical signals;

a second routing matrix (32) with two or more inputs connected to the second electro-optical converter unit (31) and at least one output connected to the operator (2).

10 11. The network according to any of the foregoing claims, comprising:

at least one operator (2);

15 a first remote unit (3) and at least a second remote unit (4), the remote units (3, 4) being designed to exchange signals with the operator (2) and to exchange radio frequency (RF) signals with the mobile terminals;

20 an interface unit (6) inserted between the operator (2) and the remote units (3, 4), the interface unit (6) having at least one input (7) for receiving signals from the remote units (3, 4) and at least one output (8) for sending signals to the remote units (3, 4), the interface unit (6) also being designed to exchange signals with the operator (2);

25 a first transmission support (9) for connecting the interface unit (6) to the remote units (3, 4), the first transmission support (9) being designed to support a main signal (44), the first transmission support (9) having a first end (10) connected to the interface unit (6) input (7) and at least a second end (11) connected to the interface unit (6) output (8), the network being characterised in that the first remote unit (3) has a first input (33) directly connected to the interface unit (6) output (8) by
30 the first transmission support (9) and a first output (34), the second remote unit (4) having a first input (35) connected to the first output (34) of the first remote unit (3) by the first transmission support (9) and a first output (36) directly
35 connected to the interface unit (6) input (7) by the first transmission support (9), the main signal (44) propagating in the

first transmission support (9) from the second end (11) to the first end (10).

12. The network according to claim 11, characterised in that the first transmission support (9) basically consists of an optic fibre loop passing through each remote unit, the main signal (44) being an optical signal propagating in the loop from the first remote unit (3) to the second remote unit (4).

13. The network according to claim 12, characterised in that it also comprises a second transmission support (41), having a first end (42) connected to the interface unit (6) input (7) and a second end (43) connected to the interface unit (6) output (8), for supporting an auxiliary signal (46) substantially identical to the main signal (44), the auxiliary signal (46) propagating in the second transmission support (41) from the second end (43) of the second transmission support (41) to the first end (42) of the second transmission support (41).

14. The network according to claim 13, characterised in that the second remote unit (4) has a second input (39) directly connected to the interface unit (6) output (8) by the second transmission support (41) and a second output (40), the first remote unit (3) having a second input (37) connected to the second output (40) of the second remote unit (4) by the second transmission support (41) and a second output (38) directly connected to the interface unit (6) input (7) by the second transmission support (41), the auxiliary signal (46) propagating in the second transmission support (41) from the second remote unit (4) to the first remote unit (3).

15. The network according to claim 14, characterised in that the second transmission support (41) basically consists of an optic fibre loop which passes through each of the remote units, the auxiliary signal (46) being an optical signal propagating in the second transmission support (41) from the second remote unit (4) to the first remote unit (3).

16. The network according to any of the foregoing claims, characterised in that it also comprises a plurality of operators which can be connected to the remote units (3, 4) by means of the interface unit (6).